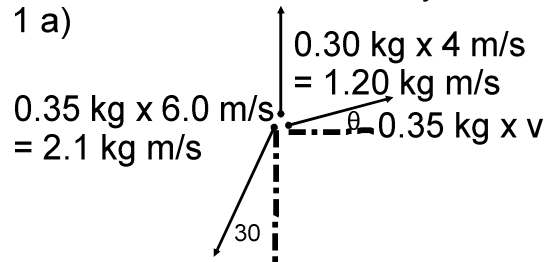
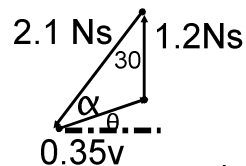


# Momentum Quiz Answer Key

1 a)



b)



c)

$$p_f^2 = 1.2^2 + 2.1^2 - 2(1.2)(2.1)\cos 30$$

$$p_f^2 = 1.485$$

$$v = 1.219/0.35 = 3.5 \text{ m/s}$$

$$\sin 30 / (0.35 \times 3.5) = \sin \alpha / 1.2$$

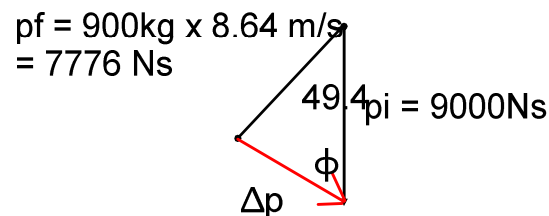
$$\theta = 90 - 30 - \alpha = 60 - 29.49 = 30.5 \text{ degrees N of E}$$

q2 a)

$$700 \text{ kg} \times 15 \text{ m/s} = 10500 \text{ Ns}$$

$900 \text{ kg} \times 10 \text{ m/s} = 9000 \text{ Ns}$   
 $p_f^2 = 10500^2 + 9000^2$   
 $p_f = 13829 \text{ Ns}$   
 $v_f = p_f / 1600 \text{ kg} = 8.64 \text{ m/s}$   
 $\tan \theta = 10500 / 9000$   
 $\theta = 49 \text{ degrees E of N}$

$$b) \Delta p = p_f - p_i$$



$$\Delta p^2 = 7776^2 + 9000^2 - 2(7776)9000\cos 49$$

$$\Delta p = 7045 \text{ Ns or } 7.0 \times 10^3 \text{ Ns or kgm/s}$$

$$\sin \phi / 7776 = \sin 49 / 7045$$

$$\phi = 56 \text{ degrees E of S}$$